
III. PRODUCT EVALUATION AND TESTING

**1984 BUYERS' STANDARDS
Pollock Blocks**

DEFECTS	Gorton's	Van de Kamp's	Mrs. Paul's
Fillet Size	24 oz. max, no folds	< 2 oz. 20% max. 2-4 oz., 40% max. > 4 oz., 40% min.	No standard
Bruises	<10% slight	0	0
Blemishes	2 each, < 1"sq. tot	0	<1/4 in. sq. skin <1/2 in. sq. belly skin max
Bones	0 (1-3?)	0 TOTAL: < 5/block	<u>3/block</u>
Parasites	0 (1-3?)	Only white or translucent, < 1/4", 1/block	0
Pack	Long, skin down	Long	Long, skin down
Voids	< 1/8" deep, < 3/4" dia.	< 1/4 inch cubed	
Dim. Tolerance	±1/16 inch	±1/16 inch	±1/8 inch

BACTERIOLOGICAL STANDARDS			
Total Plate Count	100,000/g	100,000/g	100,000/g
Coliform	100/g	(staph 10/g)	100/g
E. coli	0	20/100 g	0
Salmonella	0	0	0
Other	0		
Antioxidants	Must be FDA approved	3-5's dip in 3% TPP	None allowed
Contaminants	0 0	Mercury - < 1 ppm PCB's - < 5 ppm	0 0
Drip Loss	No standard	No standard	Less than 7%

PRODUCT EVALUATION AND TESTING

1985 PRODUCTION LOT GRADING

Each day's production was broken down into lots by boat and time of day. The lots were graded according to modified USDC Grade standards for pollock blocks (see attachment). The major changes were a de-emphasizing of bone count from five demerits to two demerits per occurrence, and adding fat as a defect counting two demerits per occurrence of over quarter sized pieces except under the lateral line. Defects decreased as the season progressed.

1985 LOT SUMMARY

Fillets

<u>Seafreeze Lot No.</u>	<u>Grade</u>	<u>Gross Pounds</u>	<u>Case Count</u>	<u>Case Numbers</u>	<u>Daycode</u>
067136 10 (Orange)	C	825	6	1-6	20685
	C		5	7-11	20785
067137-10 (Brown)	B	1,200	4	13-16	22685B
	B		2	17-18	22685A
	B		4	19-22	22785A
	B		3	23-25	22785B
	B		3	26-28	22785C
067138 -10 (Blue)	A	1,125	1	31	23585A
	A		12	32-41	23585B
	A		3	42-44	23685A

Finish Products

299648 Raw Fillets, 18 lb cs	234	13
299649 O/R fillets, 20 lb cs	220	11
299667 Minced Pinks, 3 lb	1,113	16
299669 Fillet logs, 5 lb.	115	3

The one major problem never satisfactorily resolved was the occurrence of voids and crown in the blocks. Void occurrence appears to be directly related to thaw

drip in short-term storage, indicating draining of the blocks as they waited to go into the freezer. With higher throughput and freezer cycling, less waiting should be required. Additionally, the blocks could be squeezed for a time before the refrigerant was turned on, allowing time for some of the air to escape.

Generally, the quality of the pack increased and the yield decreased as the season progressed. Problems with the fillet machine leaving rib bone tips in the belly flap led to J-cutting the fillets. Many crew members working on pin bone removal erred on the side of caution and yield suffered there as well. The skinner worked well but also seemed to take more fillet than was necessary to get the fat layer off.

The other quality progression was from layer iced fish to champagne iced fish in the later lots. The most obvious change was that chilled seawater fish, handled properly, were much firmer and had fewer bruises than layer iced fish. Live fish deliveries also worked well if the fish were brailled in small lined brailers. Pumping caused too many bruises in the live fish as they landed in the empty totes prior to weighing. Bleeding was not attempted, though this would probably have yielded fewer bruises. Unless this were done, there is no reason to use live fish as they must be held for 24-48 hours to come out of rigor.

1985 BACTERIOLOGICAL TESTS

1985 BACTERIOLOGICAL RESULT SUMMARY

Date/Lot No.	f/z	TPC 35° F	TPC 25° F	Total Coliform m	Fecal(2) Coliform	Total Staph. aereus
FILLETS						
8/14	F z		6,300	43	23	7
22685	F z	1,000	4,000	9	3	23
	F(3) z		13,000	23	3	1(1)
before dip	F f		15,000	na	na	na
after dip	F f		27,000	na	na	na
pack area	F f		41,000	43	1	4
8/15 22785	F z	250	1,300	3	3	3
	F f		6,100	4	0	0
8/22 23585	F z	1,000	12,000	14	3	15
	F f		10,000	9	1	1
8/23 23685	F z	320	1,200	9	9	7
MINCE						
7/25 20785	M f	150,000	na	na	na	na
8/14 22685	M f		3.9x10 ⁶	43	2	4(1)
poor clean						
8/21 23485	M z	9,200	6,300	93	15	21
8/22 23585	M z	860	3,900	15	15	3
	M f		28,000	31	1	1
8/23 23685	M z	1,300	5,300	93	3	4

NOTES:

- 1) Salmonella determinations - Positive test results by FITC using rapid identification strips. All tests by Bio Chem were negative.
- 2) Biochemical characterization of the FC isolates run by FITC showed none of the fillet samples contained Escherichia coli. Samples run on August 14 were characterized as Citrobacter freundii, Klbsella, and Enterobacter spp. Bio Chem identified Enterobacter cloacae, Hafnia alvei, and Streptococcus faecalis in samples from that date.
- 3) Channel water was used for make-up water during the unloading for this run -channel water is high in Escherichia coli, but not in coliforms isolated in August 14 samples.

The FITC ran plate counts on fish skin surface samples from two loads of fresh pink salmon on July 17, 1985. Other samples from frozen fish were run during

rancidity control experiments and test block production in Seattle prior to the 1985 season.

Skin samples	TPC per cm sq	
A	2,900	
B	2,200	
	<u>4 months</u>	<u>9 months</u>
Mince from frozen fish		
Fresh	80,000	75,000
Refrozen	60,000	14,000
Refrozen, Sodium Erythorbate (NaEr)	60,000	
Fillet, deep skinned by hand		145,000
Refrozen		29,000

Buyers' standards were used for guidance in the bacteriological standards. During the season, the only tests run on a routine basis were Total Plate Counts until the last week of production. With one notable exception, these showed uniformly low overall levels. However, when a more complete spectrum of tests was run, it became apparent that there were problems with pathogens, which were attributed to the use of channel water to pump out a live delivery. That practice had already been discontinued, and a more vigorous cleanup effort, particularly of the deboner, was undertaken.

After the season was over, tests were run on frozen samples which showed levels consistently over accepted standards for coliforms and staphylococcus. Based on analysis of the pathogens, Dr. Wetzler of Bio-Chem, the microbiologist, concluded that the source of contamination was probably human and/or animal contact, and that more thorough scrubbing of hands and use of a germicidal soap before handling the fish should be required. Iocide hand dips were used extensively during the processing, but he felt that scrubbing was necessary before these could be effective. There was extensive hand contact, owing to the difficulty of removing pin bones while wearing gloves.

For the next season, gloves should probably be required, as well as more thorough scrubbing of hands and raingear. Cutting the fillet into strips could be done wearing gloves. Some fillet operations have foot dips as well when entering or leaving the fillet area.

1986 PRODUCT EVALUATION

Seafoods from Alaska Product

Several mince and salt addition rates were prepared to determine their effect on texture, binding and visual appeal. Logs of 4" diameter were used for these experimental runs.

Salt Levels	Mince Levels				
	0%	15%	30%	15% (washed)	100%
0.0%	X	X	X	X	X
0.5%	X	X	X		
1.0%	X	X	X	X	X

Prepared samples were steamed and an informal tasting was done with Roland Schwanke, Gary Ervin, Paul Peyton and Chuck Crapo. The 100% and 30% mince products were not as desirable as the 15% mince. Everyone preferred the 0% mince as the best product. The 15% mince seemed to be a good compromise, and everyone agreed that the mince did not affect the taste. The mince was not objectionable at that level. Both salt levels provided good binding of the mince products. They held together well after cooking. The consensus was that 1.0% salt made the product too salty while 0.5% had the right amount of salt. No salt provided a neutral taste and no binding.

The results of those tests follow:

% Mince	% Salt	Taste	Texture	Appearance
0	0.0	Mild, good	Flaky, moist	Crossed grain
0	1.0	Notice salt	Flaky, moist	Same, dark streaks
15	0.0	Mild, good	Slight coarse	Detectable mince
15	0.5	Detect salt	Slight tough	Detect mince
15	1.0	Notice salt	Tougher	Detect mince
30	0.0	Mild, good	Mince is mealy	Obvious mince
30	0.5	Mild, good	Mince is mealy	Obvious mince
30	1.0	Notice salt	Mince is mealy	Obvious mince
100	0.5	Mild, bland	Crumbly	Burgerlike
100	1.0	Notice salt	Tighter	Burgerlike

North Pacific Processors Product

Standard defect tests were run during processing. Note that the thaw drip for most samples tends to be very high. The combination mince/fillet samples were mixed more and had salt added which reduced thaw drip considerably. The stuffed product was laid on freezer racks for blast freezing but ended up in the

aisle of the shelf freezer, which led to slow freezing and high drip loss compared to plate frozen products.

Several problems associated with the production set-up became obvious, but, due to space and time constraints, could not be addressed. These centered on lack of space for trimming and inspection, the lack of qualified inspectors and the lack of refrigerated holding space for stockpiled product.

NPP QC EXAMINATIONS

<u>8/20 Product</u>	<u>Thaw Drip</u>	<u>Defects</u>
1. Mince	10.75%	2 skin
2. Mince	12.74%	1 string
3. Fillet	6.58%	14 minor bones 2 major bones 1 skin
4. Fillet	4.90%	15 minor bones 1 major bone
5. Fillet	8.35%	22 minor bones
6. Fillet	8.89%	14 minor bones 1 major bone
7. Mince / Fillet	2.15%	16 minor bones 1 major bone
8. Mince / Fillet	3.50%	11 minor bones 1 major bone 1 skin
Average Mince	11.74%	Minimal
Average Fillet	7.18%	16 minor bones 1 major bone
Average Mince / Fillet	2.82%	14 minor bones 1 major bone

<u>8/24 Product</u>	<u>Thaw Drip</u>	<u>Defects</u>
1. Mince (Bibun)	9.72%	none
2. Mince (Beehive)	10.64%	none
3. Fillets	10.66%	4 minor bones 1 white skin 1 black skin
4. Fillets	9.16%	3 minor bones 1 bruise
5. Fresh Fillet	—	2 short ribs

6. Fresh Fillet

6 pinbones

1 pinbone

3 soft fillets

The largest unresolved problem is the high bacterial counts. According to preliminary work done at the FITC, nearly all the samples have APC's over 100,000 (for the 25° test). The high bacterial counts are probably due to slow movement of the product, repeated handling, and inadequate time/ temperature control. These problems could be addressed through revising the line layout and providing a chilled space to work in, but this was not feasible on a one day run. Test runs using standard 35° poured plate methods show much lower APC's, well within buyers' standards.

Total coliforms were generally in excess of the industry standard maximum of 100. High coliform counts probably indicate inadequate equipment sanitation and have been observed in many other operations using automated filleting and skinning equipment. Inadequate cleaning allows the hardier coliforms to become the dominant culture which contaminates later fish. The coliform species identified are not in themselves health risks but do indicate a problem. Fecals were generally quite low, indicating that the contamination is probably not of human origin. Unfortunately, the bacterial information was not available until after the run was completed due to the length of time required to transport the samples and conduct the tests.

It appears that addition of a caustic strip following foaming and high pressure washing is the necessary added step. TSP has been suggested as an agent that would do the job. A rinse with highly chlorinated water should follow.

86 PINK SALMON BACTERIOLOGICAL DATA
NORTH PACIFIC PROCESSORS PRODUCTION

Sample	Size	TPC/g	Tot C/g ⁽³⁾	Fec/g	Staph/g	Grade	Quant	Dispose
C23286	7.5	14,000	<u>460</u> 43	0.9 0.4	<0.3	B/C	553	AFDF
B23286 ⁽²⁾	6.5	130,000 ⁽¹⁾	<u>460</u> 93	<u>23.0</u> <u>9.3</u>	<u>110.0</u>	A	1170	HOLD
			<u>460</u> 9.3	2.3 0.7	<0.3			
		1,400						
	7.5	130,000 ⁽¹⁾	<u>240</u> 24	2.1 <0.3	0.9 0.3	A	668	AFDF
			<u>460</u> 9.3	<0.3 <0.3	0.4 0.4			
		21,400						
		18,000						

F23286	6.5	61,000 ⁽¹⁾	<u>460</u>	0.9	<0.3	C	434	OCFD
		39,000	<u>1100</u>	<0.3	<0.3			
	7.5	48,000 ⁽¹⁾	23	0.9	0.4	C	1782	AFDF
		31,000	<u>460</u>	0.9	<0.3			
H23686 ⁽²⁾	7.5	160,000 ⁽¹⁾	<u>640</u>	<u>23.0</u>	0.4	A	962	500 AFDF
		6,300	43	2.3	9.3			462 OCFD
			93	<0.3				
B23686	7.5	100,000 ⁽¹⁾	<u>460</u>	<u>4.3</u>	2.3	A	3339	1339 AFDF
		7,600	<u>150</u>	<0.3	<0.3			2000 OCFD
		8,300	93	0.4	<0.3			
		12,100	23	<0.4	<0.3			
F23686	6.5	41,000 ⁽¹⁾	<u>1100</u>	2.3	9.3	A/B	1457	OCFD
		11,000	<u>460</u>	<0.3	0.4			
			43	<0.3				
		19,000	93	0.4	0.7			
		10,000	75	<0.3	0.4			
		15,000	93	0.4	<0.3			
	7.5	130,000 ⁽¹⁾	<u>1100</u>	0.9	0.9	B	2624*	1000 AFDF
		21,000	<u>110</u>	<0.3	<0.3			1624 OCFD
		22,000	<u>430</u>	0.4	<u>24</u>			
		8,500	43	0.4	0.9			
		16,000	93	<0.3	0.9			
SFA15%	6.5	3,900	4.3	0.3	4.3	A	269	OCFD
SFAfil	7.5	17,000	4.3	0.7	4.3	B	630	OCFD
SFAfil	6.5						294	OCFD
M23686	6.5						93	
	7.5						158	

NOTE: Underlined values exceed buyers' standards or ICMSF marginal limits.

(1) Tests run by FITC using 25 deg. test which gives higher numbers than standard 35 deg. poured plate test.

(2) Fails to meet standards of contract and may not be useable.

(3) Contract specifications call for less than 100 C/g, as is stated in various buyers specifications. As nearly all samples exceed this level, but show very low fecal coliform, TOC's and staph levels, this requirement will be waived if the contractor issues a letter explaining the reason the level is so high and corrective measures that would eliminate the problem in commercial production.